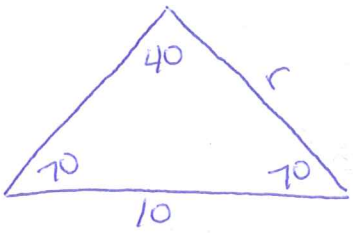
Name: _____ Date: _____

Area of Regular Polygons- Given a Side Length HW

Directions: Find the area of the regular polygon. Show all work. Round to the nearest tenth.

1. Find the area of a **regular nonagon** with perimeter of 90cm. $n=9$ $s=\frac{90}{9}=10$



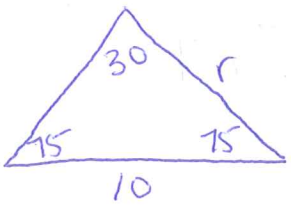
$\frac{\sin 70}{r}=\frac{\sin 40}{10}$

$r=14.6$

$A=9\left(\frac{1}{2}\right)(14.6)(14.6)\sin 40$

$A\approx 616.6\ cm^2$

2. Find the area of a **regular dodecagon** with perimeter of 120m. $n=12$ $\frac{120}{12}=10=s$



$\frac{\sin 75}{r}=\frac{\sin 30}{10}$

$r=19.3$

$A=12\left(\frac{1}{2}\right)(19.3)^2\sin 30$

$A\approx 1117.47\ m^2$

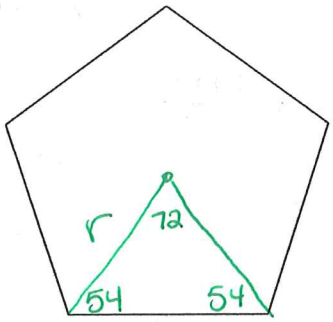
3. Find the area of a **regular triangle** with perimeter of 21 km.

Oh! Look :)

$A=\frac{1}{2}(7)(7)\sin 60$

$A\approx 21.2\ km^2$

4. s = 12m



$\frac{\sin 72}{12}=\frac{\sin 54}{r}$

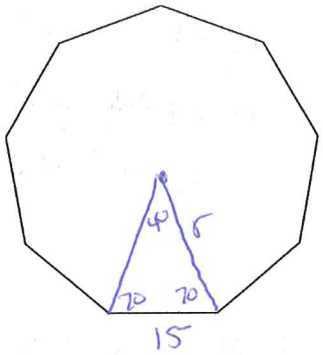
$r=\frac{12\sin 54}{\sin 72}$

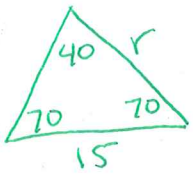
$r\approx 10.2$

$A=5\left(\frac{1}{2}\right)(10.2)^2\sin 72$

$A\approx 247.4\ m^2$

5. S = 15 ft $n=9$





$\frac{\sin 40}{15}=\frac{\sin 70}{r}$

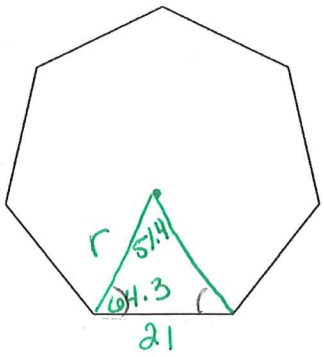
$r=\frac{15\sin 70}{\sin 40}$

$r=21.9$

$A=9\left(\frac{1}{2}\right)(21.9)^2\sin 40$

$A\approx 1387.3\ ft^2$

5. s = 21km



$A = 7\left(\frac{1}{2}\right)(24.2)^2 \sin 51.4$

$A \approx 1601.9\ km^2$

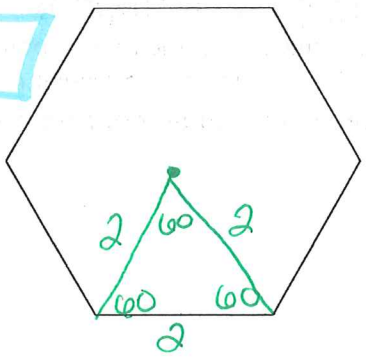
$\frac{360}{7} = 51.4$

$180 - 51.4 = \frac{128.6}{2} = 64.3$

$\frac{\sin 51.4}{21} = \frac{\sin 64.3}{r}$

$r = 24.2$

6. S = 2m

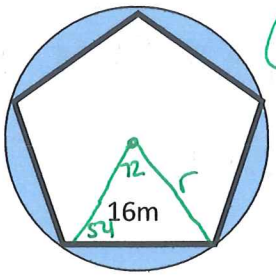


$A = 6\left(\frac{1}{2}\right)(2)^2 \sin 60$

$A \approx 10.4\ m^2$

Directions: Find the area of the shaded region. Show all work.

7.



Circle - Pentagon

$\frac{\sin 72}{16} = \frac{\sin 54}{r}$

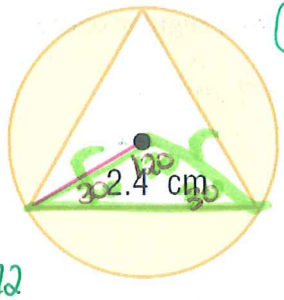
$r = 13.6$

$A = \pi(13.6)^2 - 5\left(\frac{1}{2}\right)(13.6)^2 \sin 72$

$A = 184.96\pi - 439.8$

$A \approx 141.3 m^2$

8.



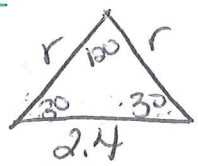
Circle − △

$A = \pi(1.4)^2 - 3\left(\frac{1}{2}\right)(1.4)^2 \sin 120$

$A \approx 3.7 cm^2$

$\frac{\sin 120}{2.4} = \frac{\sin 30}{r}$

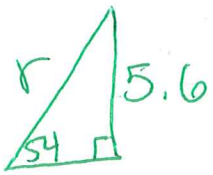
$r = 1.4$



Spiral: Using Apothem and Radius

Directions: Find the area of the regular pentagon given the information provided.

9. AP=5.6 cm



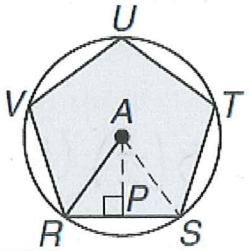
$\sin 54 = \frac{5.6}{r}$

$r = 6.9$

$A = 5\left(\frac{1}{2}\right)(6.9)^2 \sin 72$

$A \approx 113.2\ cm^2$

10. AR=12m



$A = 5\left(\frac{1}{2}\right)(12)^2 \sin 72$

$A \approx 342.4\ m^2$